DUAL-WALL FRAMES: ESSENTIAL FOR SEISMIC SAFETY

Earthquakes do not only test the strength of a building structure — they test the reliability of every connection within the building envelope.
Recent earthquakes in L'Aquila, Granada and Emilia demonstrated a critical weakness in traditional precast building design: cladding panels were often treated merely as “dead loads” instead of active structural components.
The result?
Connection failures, damaged façades, and in some cases dangerous panel collapse during strong seismic activity.

Traditional fastening systems are no longer enough
Conventional precast frame systems are typically designed with columns, beams, and floor diaphragms carrying the structural loads, while façade panels are attached separately using rigid mechanical fixings.
Under severe seismic movement, however, buildings experience horizontal drift and deformation.
Rigid screw or rivet connections are unable to absorb these movements effectively. As the structure shifts, massive racking forces are transferred directly into the façade panels, creating:

- cracking and panel damage
- fastening failure
- façade instability
- dangerous panel drop-off
- major repair costs and safety risks

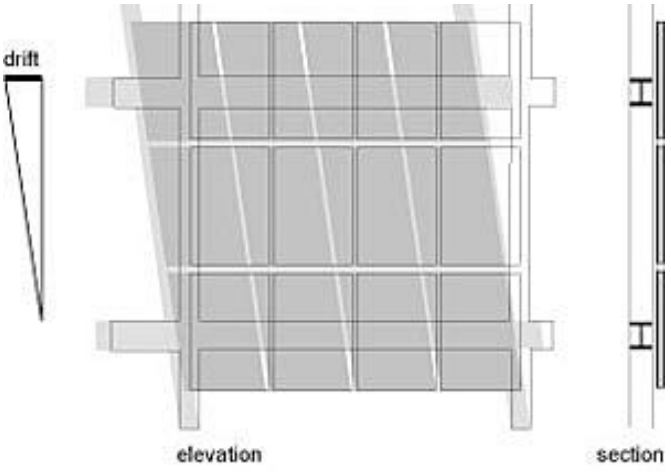
Modern seismic engineering now recognizes that façade systems must become an integrated part of the building’s seismic strategy.

The SAFECLADDING breakthrough
The European SAFECLADDING research project was launched to address exactly these challenges.
Its objective was clear:

- improve the seismic behavior of precast structures
- develop innovative fastening technologies
- create safer connection systems for cladding panels
- prevent panel failure during strong earthquakes

The research confirmed that buildings in seismic regions require a **dual wall-frame system** — an integrated structural concept where the façade and structural frame work together safely under seismic loads.

What is a dual-wall frame system?



A dual wall frame combines:

- the primary structural frame
- cladding panels
- advanced connection systems

into one coordinated seismic-resistant solution.
In this concept, façade panels are no longer passive elements.
Instead, they are connected in a way that allows controlled movement during seismic activity while maintaining structural integrity and occupant safety.
The key requirement is simple:
The façade must be able to move with the building without transferring destructive forces into the panels.

Flexibility is the key to seismic performance

One of the most important lessons from seismic research is that flexible bonding systems outperform rigid mechanical fixings in earthquake conditions.
Why?
Because flexible adhesive bonding systems can:

- accommodate horizontal drift
- absorb dynamic movement
- reduce stress concentrations
- dissipate seismic energy
- prevent cracking and panel detachment

Rigid screw or rivet connections often concentrate stresses at fixed points. Flexible bonding distributes these stresses more evenly across the façade system.
This significantly improves:

- seismic resilience
- façade durability
- long-term structural reliability
- occupant safety

Adhesive bonding: the modern solution for seismic façades

Advanced bonding technologies are increasingly becoming the preferred solution for modern cladding systems in seismic zones.
A properly engineered flexible bonding connection:

- allows differential movement between floors
- prevents transmission of racking forces
- protects façade panels against failure
- enhances wind and seismic resistance simultaneously

This makes adhesive bonding not only a safer solution for earthquakes, but also a highly effective strategy for overall façade performance.

Building safer façades for the future

As seismic regulations continue to evolve, façade engineering must evolve with them.
The failures observed during past earthquakes clearly demonstrate that traditional rigid fastening methods are insufficient for modern seismic safety requirements.
Dual-wall frame systems combined with flexible bonding technology provide:

- improved seismic safety
- superior façade stability
- reduced risk of panel fallout
- enhanced building resilience
- long-term performance reliability

For modern precast architecture in seismic regions, the future is clear:
Flexible bonded dual-wall frame systems are no longer an option — they are a necessity.